

## REMARKS

Claims 5-9 and 13-21 are all the claims pending in the application.

## PRIOR ART REJECTIONS

Claims 5-9 and 13-19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Akram (U.S. Patent No. 6,946,732) in view of Charkravorty (U.S. Patent No. 6,181,569) in view of Qi (U.S. Patent No. 6,774,497) and/or in view of Lance (U.S. Patent No. 5,697,148) and/or Ho (U.S. Patent No. 6,849,955). Applicants traverse these rejections because the cited references fail to disclose or suggest all of the claim limitations.<sup>1</sup> In addition, given the context of all of the prior art cited by the Examiner, which strongly teaches away from the claimed invention, one of skill in the art would not have combined the features of Akram and Charkravorty to arrive at the claimed invention. Specifically, at least the following limitations are not disclosed or suggested:

### Claims 5 and 14:

a plurality of conductive bumps formed on the plurality of bond pads, wherein said bumps align with corresponding solder pad openings on an upper surface of the substrate, and ***wherein a standoff between said chip and said substrate is provided mainly by said conductive bumps;***

As explained in Paragraph 9 of the patent specification, a problem associated with the individual mounting of a singulated IC chip onto a substrate is the difficulty of balancing the IC chip on a single, central row of bumps. The present claimed invention overcomes this problem by mounting an array of chips with center row(s) of bumps on a substrate so that balance can be achieved. The bumps provide the necessary standoff between the chips and substrate, which is required during subsequent processing. This also enables multiple chips to be handled and

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<sup>1</sup> Applicants incorporate by reference their arguments for patentability in the Amendment filed on March 14, 2011.

processed together, rather than individually, thereby making the process more efficient and less costly [paragraphs 27 and 28].

Akram also addresses the problem of the chips being unstable when they are mounted. See col. 3, lines 28-65 and figures 3, 5 and 6. Akram, however, teaches a different solution to the problem and teaches away from the claimed invention, which is a significant factor to be considered in determining obviousness. MPEP 2145(D)(1). Rather than mounting an array of chips on a substrate, Akram places stabilizers at the periphery of the individual chips. See stabilizers 50 in figures 8-19. These stabilizers allow a minimum uniform distance to be maintained between the chip and substrate. Col. 10, lines 7-15. By relying on the stabilizers on the periphery, Akram fails to meet the limitation that requires and that a standoff between said chip and said substrate be provided mainly by said conductive bumps.

Citing MPEP 2145, the Examiner's response to this argument is that the stabilizer embodiment is simply an alternative method and there is no suggestion that the prior art of Akram would not be compatible or cannot be combined with Charkravorty. It is correct that the MPEP states that "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed." MPEP 2141.02(VI). However, the MPEP also states that "A prior art reference must be considered in its entirety, i.e., as a whole." MPEP 2145(D)(1).

When considered as a whole, Akram criticizes and discourages the prior art embodiment the Examiner is relying on in making the rejection. For example, col. 2, line 57 to col. 4, line 20 explains in great detail the problems with the Akram prior art. It also notes that embodiment the

Examiner is relying upon is an “inherently unstable arrangement.” Col. 4, lines 8-14. In effect, Akram teaches away from any embodiment with central rows of bumps that does not have stabilizers at the periphery of the individual chips.

Applicants also disagree with the Examiner’s characterization of Chakravorty carrier frame 318 as the claimed substrate. One of skill in the art would understand that item number 318 is not a substrate that is used for mounting/attachment of the chip array. Rather, it is actually a carrier frame, whereby the wafer sections 317 are attached onto, merely to facilitate the encapsulation process of the wafer sections (See col. 12, line 45 to col. 13, line 2). In addition, the wafer sections are not mounted onto the carrier frame face-down (i.e. bumps facing frame), but rather with the bumps facing up, such that removal of the encapsulation material later will expose the bumps (See col. 13, lines 3 – 8). Thus, it is not a substrate that is used as an interposer for the chip, as part of the chip package.

This is substantially different from the present claimed invention whereby the bumps on the chip array are mounted onto the substrate that acts as an interposer enabling redistribution of the I/Os (See for example the embodiment in Figures 6 and 7, and par. [31]). It is also clearly different from Akram, which also incorporates the use of a substrate 20, for connection to the chip (See col. 9, lines 10 – 13). As such, this is yet another reason why one of skill in the art would not have been motivated to combine Akram with Chakravorty to arrive at the claimed invention.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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CUSTOMER NUMBER

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Respectfully submitted,



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